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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/801,773	03/09/2001	Osamu Kuroda	Q61192	4550

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EXAMINER	
LEE, SHUN K	
ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 11/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application N .	Applicant(s)	
	09/801,773	KURODA ET AL.	
	Examiner	Art Unit	
	Shun Lee	2878	

-- The MAILING DATE of this communication appears on th cover she t with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 August 2003 & 08 October 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2,3 and 5-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *11* is/are allowed.

6)☒ Claim(s) *2,3,5,6,8-10 and 12-17* is/are rejected.

7)☒ Claim(s) *7* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 March 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s) _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 21 August 2003 has been entered.

Claim Objections

2. Claim 16 is objected to because of the following informalities: "constrast" on line 12 in claim 16 should probably be --contrast--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 15 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 15 recites the limitation "said low density region comprises increased light emissions of a storable phosphor" which was not described in the specification.

Applicant argues that one skilled in the art would understand that the low density portion is described by an increase in light emissions relative to the high density portion. Examiner respectfully disagrees. It should be noted that the specification discloses (pg. 16, lines 7-17) that "The storable fluorescent sheet has stored and recorded a radiation inspection image 20 that has a density pattern consisting of a low-density region 20A and a high-density region 20B, as shown in Fig. 6. Note that the radiation inspection image 20 shown in Fig. 6 is obtainable by illuminating a low dose of radiation (e.g., 1 mR) to a region 21A on a storable fluorescent sheet and a high dose of radiation (e.g., 50 mR) to a region 21B, as shown in Fig. 7. Here, a storable fluorescent sheet having stored and recorded the radiation inspection image 20 is taken to be a storable fluorescent inspection sheet 21" and (pg. 13, lines 10-14) that "If the sheet 4 is scanned with the laser 11, the photostimulated luminescent light 13, which has a quantity of light corresponding to radiation image information being stored and recorded in the sheet 4, is emitted from a position on the sheet 4 irradiated with the laser light 11". Thus the specification clearly disclose that a low-density region (20A in Fig. 6) of an image (20 in Fig. 6) is recorded by illuminating a region 21A (in Fig. 7) of a sheet (21 in Fig. 7) with a low radiation dose (*e.g.*, 1 mR) and similarly a high-density image region (20B in Fig. 6) is recorded in sheet region 21B (in Fig. 7) by illuminating with a high radiation dose (*e.g.*, 50 mR). The specification further disclose that photostimulated luminescent light (13 in Fig. 1) has a light quantity corresponding to radiation image information stored and recorded in a sheet (4 in Fig. 1). Therefore, the limitation of a low density region

comprising increased light emissions of a storable phosphor as recited in claim 15 was not described in the specification.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "increased" in claim 15 is a relative term which renders the claim indefinite. The term "increased" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is unclear from the claim (and the specification; see 35 U.S.C. 112, first paragraph rejection discussed above) what the light emissions is increased relative to.

Applicant argues that one skilled in the art would understand that the low density portion is described by an increase in light emissions relative to the high density portion and that in the context of the claim recitation of high and low density regions, the recitation of claim 15 adequately informs one of skill in the art of the claim scope. Examiner respectfully disagrees for the reasons discussed above.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Newman *et al.* (US 5,420,441).

In regard to claim **10**, Newman *et al.* disclose (column 7, lines 42-47; Fig. 6) a storable fluorescent inspection sheet (106) having stored and recorded a radiation inspection image (*e.g.*, having a rectangular shape; see Fig. 11) that has a density pattern in which one or more low-density and high-density regions having a contrast difference of at least 1:20 (*i.e.*, cascading six lead masks with each 0.05 mm lead layer resulting in a roughly 30% x-ray modulation depth; column 6, lines 54-66; thus providing transmissions ranging from 1 to 0.03; column 8, lines 39-40) are arrayed in a horizontal scanning direction.

While the sheet of Newman *et al.* lacks an explicit description of a contrast difference of at least 1:50, Newman *et al.* also disclose (column 1, lines 49-53) that it is desirable for the method to provide analysis of the exposure latitude and photometric

response linearity over the 10,000:1 storage phosphor dynamic range. Newman *et al.* further teach (column 2, lines 28-46; Fig. 6) that a special test target (104) is used to expose a storage phosphor cassette (*i.e.*, storable fluorescent inspection sheet 106) which is then read and analyzed. Therefore it would be obvious to one of ordinary skill to expose the inspection sheet of Newman *et al.* with a 1:10,000 contrast difference test target and to analyze the 10,000:1 contrast difference radiation inspection image stored therein, in order to determining scanner performance (*e.g.*, exposure latitude and photometric response linearity) over the 10,000:1 storage phosphor dynamic range.

In regard to claim **9**, Newman *et al.* is applied as in claim 10 above. Newman *et al.* also disclose (column 1, line 13 to column 2, line 16) a method of inspecting influence of stray light (*i.e.*, scatter or flare artifacts) which occurs in a radiation image reader equipped with horizontal scanning means for scanning excitation light on a storable fluorescent sheet, having stored and recorded a radiation image, in a horizontal scanning direction, vertical scanning means for scanning said storable fluorescent sheet in a vertical scanning direction approximately perpendicular to said horizontal scanning direction, and reading means for obtaining an image signal which represents said radiation image by photoelectrically reading said radiation image, stored and recorded in said storable fluorescent sheet, by the horizontal scanning of said excitation light; said inspection method comprising the steps of:

(a) preparing (column 2, lines 52-55) a storable fluorescent inspection sheet that has stored and recorded a radiation inspection image which has a density pattern in

which one or more low-density and high-density regions having a contrast difference arrayed in said horizontal scanning direction;

(b) obtaining (column 2, lines 56-58) an image inspection signal representing said radiation inspection image, by photoelectrically reading said radiation inspection image from said storable fluorescent inspection sheet with said reading means; and

(c) inspecting (column 2, lines 59-60) said influence of stray light, based on an image reproduced from said image inspection signal.

10. Claims 2, 3, 5, 6, 8, 12-14, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Newman *et al.* (US 5,420,441) in view of Farrokhnia *et al.* (US 6,231,231).

In regard to claims **2**, **3**, **12**, and **16**, Newman *et al.* is applied as in claims 9 and 10 above. The method of Newman *et al.* lacks that the boundary line between the low-density and high-density regions extends between opposite edges of the sheet and is a straight line inclined (*e.g.*, on a diagonal) with respect to the horizontal scanning direction and that the density pattern includes two high-density regions and one low-density region in the order of one high-density region, the low-density region, and the other high-density region arrayed in the horizontal scanning direction. However, test targets are well known in the art. For example, Farrokhnia *et al.* teach (column 7, lines 25-58) to incline the straight boundary lines between a plurality of low-density and high-density regions with respect to the horizontal scanning direction in order to determine both horizontal and vertical MTF in an x-ray system. Therefore it would be obvious to

one of ordinary skill to incline the straight boundary lines (*e.g.*, on an image diagonal) in the method of Newman *et al.* between a plurality of low-density and high-density regions with respect to the horizontal scanning direction, in order to determine a plurality of horizontal and vertical MTF along a line from one radiation inspection image edge to the opposing radiation inspection image edge.

In regard to claims **5**, **6**, and **17**, Newman *et al.* is applied as in claim 10 above. In addition, Newman *et al.* in view of Farrokhnia *et al.* is applied as in claims 2, 3, and 16 above.

In regard to claims **8** and **14** which are dependent on either claim 5 or claim 6, Newman *et al.* disclose (column 6, lines 57-63; column 7, lines 42-47; Fig. 6) disposing a radiation transmittable member (104) at a position corresponding to said density pattern on a storable fluorescent sheet (106), the radiation transmittable member (104) having a radiation transmission factor which corresponds to said contrast difference; and storing and recording said radiation inspection image in said storable fluorescent sheet (106), by illuminating said storable fluorescent sheet (106), on which said radiation transmittable member (104) has been disposed, with a dose of radiation that corresponds to said contrast difference (*i.e.*, single photographing).

In regard to claim **13** which is dependent on claim 8, the method of Newman *et al.* lacks that the radiation transmittable member partially overlaps said storable fluorescent inspection sheet. However, Newman *et al.* also disclose that there exists clear regions (*e.g.*, 4 in Fig. 5) which are used for certain analysis (*e.g.*, FFT; column 7, lines 15-18; column 13, lines 25-40). Therefore it would be obvious to one of

ordinary skill to provide a radiation transmittable member partially overlaps said storable fluorescent inspection sheet in the method of Newman *et al.*, in order to obtain a plurality of clear areas (*e.g.*, a region where the radiation transmittable member does not overlap the storable fluorescent inspection sheet) for analysis of regions where unattenuated incident radiation has been recorded.

Allowable Subject Matter

11. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. Claim 11 is allowed.

13. The following is a statement of reasons for the indication of allowable subject matter: the instant application is deemed to be directed to an nonobvious improvement over the invention patented in US Patent 5,420,441. The improvement comprises in combination with other recited elements, repeating the disposition of a radiation shielding member on a storable fluorescent sheet and the illumination with a radiation dose that corresponds to a contrast difference, until a density pattern is obtained.

Response to Arguments

14. Applicant's arguments filed 21 August 2003 have been fully considered but they are not persuasive.

Applicant argues (last two paragraphs on pg. 12 to third paragraph on pg. 13 of remarks filed 21 August 2003) that the dynamic range (described in column 1 of Newman *et al.*) pertains to the scanning device or reader and not the contrast in the

phosphor sheets and that the dynamic range can relate to multiple aspects of the reader quality, such as bit error or quantization error but this does not import any contrast requirements to the storage sheet itself. Examiner respectfully disagrees.
Newman *et al.* state (column 1, lines 49-51) that "It is also desirable that the technique provide analysis of the following. 1) Exposure latitude and photometric response linearity over the 10,000:1 dynamic range of the storage phosphor". Thus it is clear that it is the storage phosphor that has a dynamic range of 10,000:1 and further that the technique should analyze the photometric response linearity over the 10,000:1 storage phosphor dynamic range. Newman *et al.* also state (column 6, lines 37-52) that "The procedure developed to perform this task is based on exposing (FIG. 6) a special test target (FIGS. 4 and 5), scanning the resulting test target storage phosphor radiography image, and analyzing the result with a computer algorithm. The diagnostic image quality performance of a storage phosphor reader can be directly inferred by analyzing the following performance attributes of the scanner. 1) Exposure latitude and linearity ... 3) Spatial resolution (MTF) ... 7) Flare light artifacts". Note that the special test target is used to expose a storage phosphor cassette (*i.e.*, a storable fluorescent inspection sheet) which is then read and analyzed (see for example, column 2, lines 28-46). Thus Newman *et al.* also teach the use a special test target for the analysis of scanner exposure latitude and linearity performance over the 10,000:1 storage phosphor dynamic range.

Applicant argues (last paragraph on pg. 13 to third paragraph on pg. 15 of remarks filed 21 August 2003) that (a) the coupon edge 1410 of Farrokhnia *et al.* is not

a straight boundary line between a low and a high-density region; (b) there would be no reason to have the coupon edges 1410 intersect both edges of the subphantom since the coupon 375 would overlap the resolution patterns 180 which are used to calibrate the system; and (c) the edges of the coupon cannot align with a pixel column and thus the rotated section would not extend all the way to the edges since this would cause alignment of a pixel column. Examiner respectfully disagrees. First it is important to recognize that a boundary is defined[1] as "something that indicates a border or limit". Thus, the transition (*i.e.*, border or limit) between a low and a high-density region is, by definition, a boundary line. Farrokhnia *et al.* state (column 7, lines 26-58) that " ... coupon 375 is preferably composed of a metallic sheet such as a tungsten sheet ... Similar to the resolution patterns 180 of the resolution sub-phantom 170 of FIG. 1, the coupon 375 may be used to determine Modulation Transfer Function (MTF) of the x-ray system. Although the preferred embodiment of the coupon phantom 300 includes one coupon 375, a greater number of coupons of varying sizes and thickenesses may also be used. The coupon 375 has coupon edges 1410. The MTF of the X-ray system may be determined by comparing the transitions at the coupon edges 1410 with respect to position. Examining the resolution patterns 180 of the resolution sub phantom 170 of FIG. 1 ... the resolution patterns 180 may only calculate the horizontal MTF of the system and not the vertical MTF of the system. However, in the coupon sub-phantom 370, the coupon edges 1410 have been rotated 5 degrees with respect to the coupon sub-phantom 370. The coupon edges 1410 thus provides both

[1] The American Heritage® Dictionary of the English Language, Third Edition copyright © 1992 by

vertical and horizontal variation, The horizontal and vertical variation allow the computation of both the horizontal MTF and vertical MTF of the x-ray system. The amount of rotation of the coupon 375 is related to the resolution of the x-ray system in terms of pixel size as well as the size of the coupon 375. Additionally, rotating the coupon 375 assists in the measurement of the MTF because the edges of the coupon 375 do not align with a pixel column. For many commercially available systems, a rotation of approximately 5 degrees may be the most desired rotation although other rotations may also provide accurate MTF determination". Therefore the coupon edge 1410 as illustrated in Fig. 14 of Farrokhnia *et al.* indicates an inclined straight boundary line (*i.e.*, transition) which is used to compute both horizontal and vertical MTF instead of resolution patterns 180 which can only be used to compute the horizontal MTF. Further applicant's rationale that the rotated section would not extend all the way to the edges since this would cause alignment of a pixel column is improper since it is clear that from Farrokhnia *et al.* that it is the rotation of the plurality of coupons which leads to coupon edges that do not align with a pixel column (*i.e.*, coupon edges are align with a pixel column before rotation).

Applicant argues (last paragraph on pg. 15 of remarks filed 21 August 2003) that since the clear region is used for a particular purpose, there would be no reason to remove that area from the test target so that a radiation transmittable member partially overlaps a storable fluorescent inspection sheet and is thus improper hindsight reasoning. In response to applicant's argument that the examiner's conclusion of

obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). Newman *et al.* state (column 13, lines 32-34) that "The power spectrum will be calculated over a full exposed flat field area of the test target in both the fast scan and slow scan directions". Thus it is clear that the clear region is a full exposed flat field area (*i.e.*, where unattenuated incident radiation has been recorded). Therefore it would be obvious to one of ordinary skill to provide a radiation transmittable member partially overlaps said storable fluorescent inspection sheet in the method of Newman *et al.*, in order to obtain a plurality of clear areas (*e.g.*, a region where the radiation transmittable member does not overlap the storable fluorescent inspection sheet) for analysis of regions where unattenuated incident radiation has been recorded.

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (703) 308-4860. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (703) 308-4852. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

CONSTANTINE HANNAHER
PRIMARY EXAMINER
GROUP ART UNIT 2878

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October 29, 2003